

Case Report

Laparoscopic Management of Omental Torsion Secondary to Inguinal Hernia: Report of a Case

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Omental torsion is a rare cause of acute abdomen. The clinical symptoms can mimic other acute abdominal disorders, and therefore many patients are often diagnosed during a laparotomy performed under a presumptive diagnosis of appendicitis, cholecystitis and so on. Recent advances in diagnostic modalities has made it possible to determine the correct preoperative diagnosis of omental torsion, and the chances of treating this rare condition are therefore expected to increase. Laparoscopic surgery has been used extensively for various emergent disorders; however, the laparoscopic management of omental torsion might be troublesome for most surgeons. A case of omental torsion secondary to inguinal hernia is herein reported, where a huge tormented omentum was successfully managed laparoscopically. It was useful to hang up the pedicle of the congested and fragile omentum with polyester tape to manage it atraumatically. Moreover this device made it easy to remove of the specimen through a 4-cm minilaparotomy.

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Introduction

Omental torsion is a rare cause of acute abdomen which often dictates an emergency laparotomy. The symptoms are nonspecific and similar to almost any acute abdominal disorder, thus a preoperative correct diagnosis is difficult and many patients with omental torsion are usually diagnosed during an emergency laparotomy.

However, with recent advent in cross-sectional imaging modalities, such as multi-row detector computed tomography (MDCT), appropriate management can now often be planned beforehand under a correct preoperative diagnosis.¹ Laparoscopic surgery now plays an increasingly important role in various types of emergency surgery, such as acute appendicitis, acute cholecystitis, and duodenal ulcer perforation.² These diseases are relatively prevalent, so the technical experience and pitfalls have been progressively accumulated, however, the laparoscopic management of torsion still tends to be troublesome for most surgeons.

This report describes a case of omental torsion, where the emergency operation was carried out laparoscopically under a preopera-

tive diagnosis obtained based on the characteristic CT findings. A laparoscopic inspection revealed a huge tormented omentum which occupied a large part of the abdominal cavity, thus indicating that handling the congested and edematous omentum with laparoscopic instruments might result in unnecessary bleeding and contamination of the abdominal cavity. The pedicle of the tormented omentum was hung with a thin polyester tape to handle it atraumatically. Moreover, this simple device is considered to be useful not only to perform a resection, but also to remove the diseased omentum through a minilaparotomy.

Case Report

A 48-year-old male presented at our hospital with a 3-day history of right-sided abdominal pain. He had never previously experienced nausea, vomiting, or diarrhea. His medical history was remarkable for an untreated right inguinal hernia and an appendectomy had been performed many years previous to this presentation. A physical examination revealed a mild fever and a right-sided reducible groin

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lump suggestive of an inguinal hernia. There was marked tenderness over the right subcostal area, but no guarding was seen. His white blood cell count increased to $122.1 \times 10^3 / \mu\text{l}$, CRP was 23.73 mg/dl. Abdominal radiography showed a non-specific bowel gas pattern, and no signs of a bowel obstruction or free air were seen. Abdominal MDCT scans with the administration of contrast material showed concentric streaking with hyperattenuated fatty tissue, which extended from just below the distal portion of the transverse colon to the lower right abdomen (Figure 1). This hyperattenuated tissue was seen to enter the hernia sac. A diagnosis of omental torsion secondary to a right-sided inguinal hernia was highly suspected and the patient therefore underwent laparoscopic surgery. Pneumoperitoneum was created using the standard open technique at the umbilicus, and thereafter a 10-mm, flexible laparoscope was inserted. Three more cannulas were inserted; one into the right iliac fossa and two were inserted into the right and left upper quadrant. A laparoscopic inspection revealed large amounts of free serosanguineous fluid in the upper left quadrant. The entire greater omentum was twisted several times at the left attachment of the transverse colon. The affected omentum occupied a large part of the abdominal cavity and changed to a congested and edematous with hemorrhagic extravasation. The distal part of the twisted omentum descended into the pelvis and protruded through the external foremen into the hernia sac. Although large part of the omentum adhered to the adjacent small intestines, no areas of adhesions were observed between the omentum and hernia sac. A total omentectomy was planned because almost all of the omentum seemed to be affected. However, because the pedicle of the torqued omentum was too thick and fragile, there was concern that handling this with laparoscopic forceps could cause unnecessary bleeding, and contamination of the abdominal cavity. Above all, treating the very thick pedicle of the omentum with forceps was considered to be a most difficult task. A thin polyester tape was applied around the pedicle of the torqued omentum and the entire affected omentum

was hung in order to treat it freely atraumatically (Figure 2), which thus made it possible to perform safe dissection around the diseased omentum from the abdominal wall and the adjacent small intestines. After hanging and keeping it away from adjacent organs, it was resected along the proximal side of strangled pedicle with a harmonic scalpel and an endoscopic stapling device. The specimen was too large to morcellate or cut into small pieces in a plastic bag, and therefore we tried to retrieve it as a whole. The cut end of the omentum was tied up firmly with the hanging polyester tape to prevent the specimen from slipping into the abdominal cavity. After extension of the trocar wound which was subsequently equipped with a wound protector, the tail end of the tube was pulled externally through a minilaparotomy, which subsequently allowed the extraction of the cut end of the specimen (Figure 3). The retrieval was smooth: from



Figure 2. Schema1. A thin polyester tape was applied around the pedicle of the torqued omentum to treat it atraumatically.



Figure 1. Abdominal CT with intravenous contrast showed concentric streaking from just below the transverse colon to the lower right abdomen (arrows).

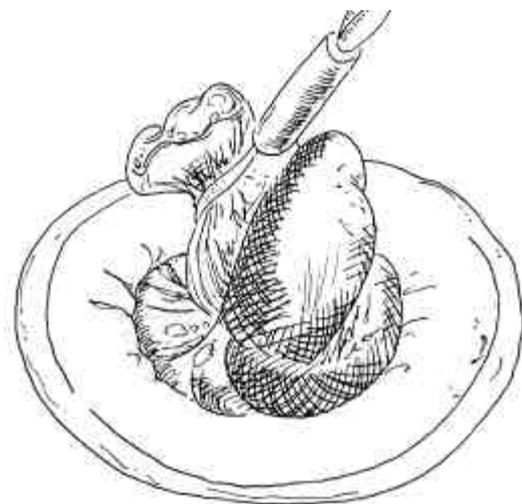


Figure 3. Schema2. After resection, the tail end of the tube was pulled externally through minilaparotomy, then the cut end of the specimen was subsequently extracted.

the apex of the omental cut end forward to its large and fatty skirts. No obstacle was encountered during this procedure. The entire omentum weighing 850 g was extracted through just a 4 cm-minilaparotomy (Figure 4). Simultaneous herniorrhaphy was not performed because the operation was in emergency setting. The operation time was 125 min. The postoperative course was uneventful and no signs of abdominal infection were observed. The patient thereafter underwent elective herniorrhaphy with a Kugel patch 9 days after the initial operation.



Figure 4. Resected specimen of the primary omental torsion. The entire greater omentum was twisted at the attachment of the transverse colon. Almost all of the omentum seemed to be affected.

Discussion

Omental torsion is a rare condition in which the omentum twists along its long axis; as a result its vascular supply is compromised, leading to congestion and necrosis. Omental torsion is pathogenetically classified into primary and secondary torsion. The former, which has no underlying cause of torsion, is less frequent. Although the etiology remains obscure, obesity, anatomical alterations or vascular anomalies of the omentum have been cited as predisposing factors to primary torsion. Secondary torsion is relatively common and results from underlying conditions such as an omental cyst, tumor, malignancy, or intraabdominal adhesion. Especially omental torsion secondary to an inguinal hernia is rare.³ The right-sided part of omentum seems more susceptible; however the entire omentum could be involved as reported herein.

The symptoms and signs of omental torsion are not specific. The most common is sudden onset acute abdominal pain, which is constant and non-radiating. On the other hand bowel symptoms such as nausea, diarrhea, and vomiting are only occasionally described.⁴ Based on the clinical manifestation, an accurate preoperative diagnosis is frequently missed. In most cases, a presumptive diagnosis

of appendicitis, cholecystitis is made. Recent diagnostic modalities such as abdominal MDCT have made it more feasible to establish a diagnosis of omental torsion preoperatively. The characteristic CT findings include a concentric streaking or "whirling" pattern of an inflammatory mass with hyperattenuated fatty tissue.^{5,6}

Some authors have proposed conservative treatment with analgesics and close follow-up in case with a confirmed preoperative diagnosis of omental torsion.^{7,9} However the potential complications such as formation of an omental abscess and spontaneous bleeding have been described.¹⁰ Even in non-complicated cases, the hospital stay may also be longer with such management.

The recommended treatment is resection and removal of the tormented omentum.¹¹⁻¹³ Recently laparoscopic management of omental torsion has been reported: It can make the wound minimal, avoid postoperative pain, and yield a shorter convalescence. In addition, it allows the thorough inspection of the abdominal cavity to exclude any possible disease; if the patient's preoperative diagnosis was uncertain.¹⁴⁻¹⁸ Above all, the treatment of a tormented omentum is technically simple, i.e., resection and extraction. However, there have been few reports noting the optimal management strategy for a large specimen in laparoscopic surgery. Many authors who reported segmental omental torsion extracted the resected omentum through a trocar port,^{17,18} however this is impossible when it is too bulky to pass through the trocar as is in the current case. Therefore, the resection and extraction of specimens without contaminating the abdominal cavity with fragmented tissue is problematic when laparoscopic surgery is used to resect omental torsion.

The first case of laparoscopic treatment for omental torsion was reported by Chung. In this report, they ligated the pedicle of the tormented omentum with a chromic catgut Endloop. The resected omentum was extracted through the trocar after cutting it up into smaller pieces.¹⁹ Gassner et al. recommended either ligating the omentum externally through an extended wound or placing the resected specimen in a bag and delivering it via the extended umbilical port site.²⁰ However, the procedure mentioned above might be tedious and time-consuming when a huge specimen has to be retrieved. Two cases of a total omental infarction treated laparoscopically were reported by Coppin et al., where the specimen of 336 g was removed through a reopened old surgical incision site.²¹ In the current case, the affected omentum was so large and handling the congested and edematous omentum with laparoscopic instruments could cause unnecessary bleeding and contamination of the abdominal cavity. Above all, treating the very thick pedicle of the omentum with forceps proved to be a most difficult task. We applied thin polyester tape around the pedicle of the tormented omentum and the entire affected omentum was hung to treat it atraumatically. By applying traction to the tape, it was possible to dissect around the pedicle, then after making sure of a safe surgical margin, the diseased omentum was resected just proximal to the strangled pedicle. The cut end of the omentum was tied up firmly with the polyester tape to prevent it from slipping into the abdominal cavity. Next the tail end of the tape was inducted externally, allowing the simple removal of the resected entire omentum, weighing 850g, through just a 4 cm-minilaparotomy,

from the apex of omental cut end forward to its large and fatty skirts without any difficulty.

In conclusion, recent advances in such diagnostic modalities as MDCT have made it possible to determine a preoperative diagnosis of omental torsion. The opportunities to treat omental torsion in laparoscopic surgery are expected to increase among general surgeons. In the laparoscopic management of omental torsion, it is useful to hang up the pedicle of the congested and fragile omentum with a polyester tape in order to manage it atraumatically. Moreover, this simple device made it easy to remove the specimen through a 4-cm minilaparotomy.

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